WHAT IS CLAIMED IS:

1. A method for manufacturing a semiconductor device, comprising:

forming a patterned film having a predetermined geometry on a semiconductor substrate; and

wet-processing the surface of said semiconductor substrate that has an exposed surface of a semiconductor material with a chemical solution containing an organic solvent as a main component, after said forming said patterned film.

2. A method for manufacturing a semiconductor device, comprising:

forming a film on a semiconductor substrate; and

removing at least a part of said film with a chemical solution containing an organic solvent as a main component to expose at least a part of the surface of said semiconductor substrate.

3. A method for manufacturing a semiconductor device, comprising:

forming an insulating film on a semiconductor substrate;

forming a conductive film on said insulating film;

forming a patterned protective film having a predetermined geometry on said conductive film;

selectively removing said conductive film utilizing said protective film as a mask;

selectively removing said insulating film to partially

expose the surface of said semiconductor substrate; and

conducting a wet processing for said semiconductor substrate with a chemical solution containing an organic solvent as a main component.

4. The method according to claim 3, wherein said selectively removing said insulating film includes removing said protective film before partially exposing said surface of said semiconductor substrate.

5. The method according to claim 3,

wherein said forming said insulating film includes forming a high-k insulating film composed of a material having higher dielectric constant than that of the silicon oxide film, and

said removing said insulating film includes:

selectively removing a part of said high-k insulating film via a dry etching utilizing said protective film as a mask;

removing said protective film; and

selectively removing the remained part of said high-k insulating film via a wet etching utilizing said conductive film as a mask to partially expose said surface of said semiconductor substrate, said wet etching being carried out by using a removing solution containing an organic solvent as a main component and a fluoride-containing compound, a removing solution containing hot phosphoric acid or a removing solution containing sulfuric acid.

6. A method for manufacturing a semiconductor device,

comprising:

forming an insulating film on a semiconductor substrate, said insulating film comprising at least a high-k insulating film that has higher dielectric constant than that of the silicon oxide film; and

selectively removing said insulating film via a wet etching with a chemical solution containing an organic solvent as a main component to partially expose said surface of said semiconductor substrate.

7. A method for manufacturing a semiconductor device, comprising:

forming a first film and a second film in a first region and a second region, respectively, on a semiconductor substrate;

forming a protecting film that covers said second insulating film;

removing said first insulating film to expose the surface of said semiconductor substrate in said first region;

removing said protective film with a chemical solution containing an organic solvent as a main component;

forming a third insulating film on said first region, said third insulating film having different thickness or different composition from said second insulating film.

8. The method according to claim 7, wherein said first insulating film, said second insulating film, and said third insulating film are formed by oxidizing said semiconductor substrate in the respective corresponding regions.

9. The method according to claim 7, further comprising forming a first high-k insulating film and a second high-k insulating film on said third insulating film and said second insulating film, respectively, said first high-k insulating film and said second high-k insulating film being composed of a material having higher dielectric constant than that of the silicon oxide film.

10. The method according to claim 1, wherein said organic solvent is a solvent having polar group.

11. The method according to claim 2, wherein said organic solvent is a solvent having polar group.

12. The method according to claim 3, wherein said organic solvent is a solvent having polar group.

13. The method according to claim 6, wherein said organic solvent is a solvent having polar group.

14. The method according to claim 7, wherein said organic solvent is a solvent having polar group.

15. The method according to claim 1, wherein said organic solvent is selected from the group consisting of: isopropyl alcohol; ethylene glycol; 2-heptanone; cyclopentanone; methylethyl ketone; glycol ether; propyleneglycol monomethyl ether; and propyleneglycol monomethyl acetate.

16. The method according to claim 2, wherein said organic solvent is selected from the group consisting of: isopropyl alcohol; ethylene glycol; 2-heptanone; cyclopentanone; methylethyl ketone; glycol ether; propyleneglycol monomethyl ether; and propyleneglycol monomethyl acetate.

17. The method according to claim 3, wherein said organic solvent is selected from the group consisting of: isopropyl alcohol; ethylene glycol; 2-heptanone; cyclopentanone; methylethyl ketone; glycol ether; propyleneglycol monomethyl ether; and propyleneglycol monomethyl acetate.

18. The method according to claim 3, wherein said organic solvent is selected from the group consisting of: isopropyl alcohol; ethylene glycol; 2-heptanone; cyclopentanone; methylethyl ketone; glycol ether; propyleneglycol monomethyl ether; and propyleneglycol monomethyl acetate.

19. The method according to claim 6, wherein said organic solvent is selected from the group consisting of: isopropyl alcohol; ethylene glycol; 2-heptanone; cyclopentanone; methylethyl ketone; glycol ether; propyleneglycol monomethyl ether; and propyleneglycol monomethyl acetate.

20. The method according to claim 7, wherein said organic solvent is isopropyl alcohol.

21. The method according to claim 1, wherein said organic solvent is isopropyl alcohol, and said chemical solution contains not less than 90 % vol. of isopropyl alcohol.

22. The method according to claim 2, wherein said organic solvent is isopropyl alcohol, and said chemical solution contains not less than 90 % vol. of isopropyl alcohol.

23. The method according to claim 3, wherein said organic solvent is isopropyl alcohol, and said chemical solution contains not less than 90 % vol. of isopropyl alcohol.

24. The method according to claim 6, wherein said organic

solvent is isopropyl alcohol, and said chemical solution contains not less than 90 % vol. of isopropyl alcohol.

25. The method according to claim 7, wherein said organic solvent is isopropyl alcohol, and said chemical solution contains not less than 90 % vol. of isopropyl alcohol.

26. A method for manufacturing a semiconductor device, comprising:

forming an insulating film on a semiconductor substrate, said insulating film comprising at least a high-k insulating film that has higher dielectric constant than that of the silicon oxide film;

selectively removing the insulating film via a wet etching with a chemical solution containing an oxidizing acid or a salt thereof to partially expose the surface of said semiconductor substrate.

27. The method according to claim 26, wherein said oxidizing acid or the salt thereof contains one or more compounds selected from the group consisting of: phosphoric acid; sulfuric acid; nitric acid; perchloric acid; permanganic acid; and salts thereof; and cerium ammonium nitrate.

28. The method according to claim 26, wherein said removing said insulating film is carried out at a chemical solution temperature of 40 degree. C to 200 degree. C.

29. A semiconductor device comprising:

a semiconductor substrate; and

a first gate insulating film and a second insulating

film formed in different regions, respectively, on said semiconductor substrate,

wherein said first gate insulating film comprises a first insulating film and a first high-k film formed on said first insulating film, said second gate insulating film comprises a second insulating film and a second high-k film formed on said second insulating film, said second insulating film having a different thickness or a different material from that of said first insulating film, and said first high-k film and said second high-k film are formed of zirconium, hafnium, lanthanoid, aluminum, indium, gallium or the oxides thereof, and have higher dielectric constant than that of the silicon oxide film.